PRELIMINARY INFORMATION

Blackline+

User's Guide

F8+, F10+, F12+, F15+, F215+, H3+, H3H+, H3T+, S12+, S15+, S18+, S218+

includes M3+ controller configuration notes

MARTIN AUDIO
LONDON

The Martin Experience

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- Pending. Please contact info@martin-audio.com for further information.

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1 Introduction

Thank you for purchasing a Martin Audio Blackline+ Series system. The Blackline+ Series is a range of portable loudspeaker enclosures designed for a variety of portable sound reinforcement and club applications.

Blackline+ products covered in this user's guide include the F8+, F10+, F12+, F15+ and F215+ full-range systems, the H3+ horn-loaded system and the S12+, S15+, S18+ and S218+ sub-bass enclosures.

Because the F8+, F10+, F12+ and F15+ are passive systems embodying correct acoustic design principles, they can be used without a controller provided their AES and peak power ratings are not exceeded and care is taken to avoid amplifier clipping.

For maximum performance, however, we recommend that Blackline+ Series systems are used with Martin Audio ***M3+***, ***DX1***, ***DX2*** or ***Engineer*** system controllers.

2 Unpacking

Each Martin Audio Blackline+ Series loudspeaker is built to the highest standard and thoroughly inspected before it leaves the factory. After unpacking the system, examine it carefully for any signs of transit damage and inform your dealer if any such damage is found. It is suggested that you retain the original packaging so that the system can be repacked at a future date if necessary.

Please note that Martin Audio and its distributors cannot accept any responsibility for damage to any returned product through the use of non-approved packaging.

3 Blackline+ Series overview

The Blackline+ Series is made up of…

2-way full-range systems:
F8+ (8"+1") passive
F10+ (10"+1") passive
F12+ (12"+1") passive
F15+ (15"+1.4") passive
F215+ (2x15"+1.4") passive

3-way all-horn full-range systems
H3+ (vertically formatted 15"+10"+1") bi-amplified
H3T+ (vertically formatted 15"+10"+1") user selectable bi-amplified or tri-amplified
H3H+ (horizontally formatted 15"+10"+1") bi-amplified

Direct radiating sub-bass systems
S12+ (single 12", ported) user-selectable 120Hz low-pass filter
S15+ (single 15", ported) user-selectable 120Hz low-pass filter
S18+ (single 18", ported) user-selectable 120Hz low-pass filter
S218+ (2 x 18", ported) direct-coupled

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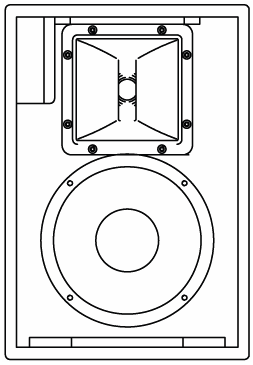
3.1 2-way passive full-range systems

F8+



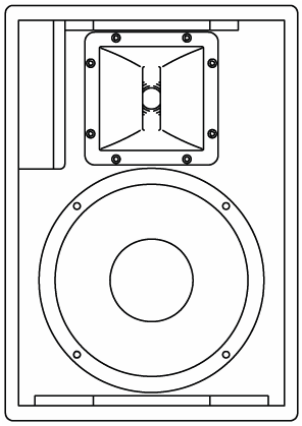
The Blackline F8+ is a versatile, two-way passive system designed for applications where high output is required from an ultra-compact enclosure. It features a long-excursion, 8” (200mm) low frequency driver and a 1” (25mm) HF compression driver mounted on a constant directivity 90° x 50° horn.

The horn is user rotatable to allow the F8+’s multi-angle enclosure to be used in either its vertical or horizontal orientation, depending on the application.

The F8+ may be used with or without a system controller. For demanding applications, Martin Audio recommends an M3+, DX1, DX2 or Engineer system controller configured to perform EQ and limiter functions.

The M3+, DX1, DX2 or Engineer system controller may also be used to configure systems for additional sub-bass cabinets – e.g. F8+ + S12+, S15+, S18+ or S218+ combinations.

F10+



The Blackline F10+ is a versatile, two-way passive system, designed to provide exceptional sound reinforcement and stage monitoring from a very compact enclosure. It features a powerful 10” (250mm) low frequency driver and a 1” (25mm) HF compression driver mounted on a constant directivity 90° x 50° horn.

Depending on the application, the HF horn can be rotated to allow the multi-angle enclosure to be used in either its vertical or horizontal orientation.

A demodulating ring fitted to the LF driver reduces distortion and improves the performance at the upper end of the LF driver’s range at high levels. Additionally, the directivity of the LF driver has been matched to the HF horn by a combination of optimisation of the water-resistant LF cone profile and improved crossover design.

The F10+ may be used with or without a system controller. For demanding applications, Martin Audio

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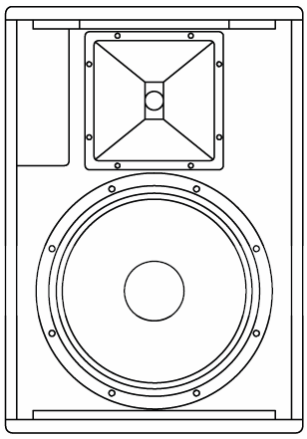
recommends an M3+, DX1, DX2 or Engineer system controller configured to perform EQ and limiter functions.

The M3+, DX1, DX2 or Engineer system controller may also be used to configure systems for additional sub-bass cabinets – e.g. F10+ + S12+, S15+, S18+ or S218+ combinations.

F12+



The Blackline F12+ is a high power, compact two-way system with a new, vented-chassis, 12” (300mm) LF driver and a new 1” (25mm) exit compression driver mounted on a rotatable 80° x 50° constant directivity HF horn.

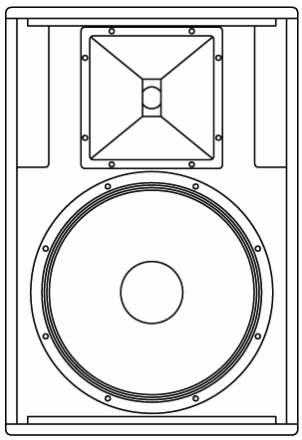
The LF driver has a tough, water resistant cone and features a high BL motor with a flat-wire copper coil and an aluminium demodulating ring. This reduces intermodulation distortion and improves midrange performance when driven hard. Increased excursion is available by virtue of a triple roll surround and deep motor structure.

The directivity of the LF driver has been matched to the HF horn in the crossover region by improved crossover design and cone profile optimisation, also the new HF compression driver utilises an ultra-lightweight Kapton diaphragm for extended high frequency response.

The F12+ may be used with or without a system controller. For demanding applications, Martin Audio recommends an M3+, DX1, DX2 or Engineer system controller configured to perform EQ and limiter functions.

The M3+, DX1, DX2 or Engineer system controller may also be used to configure systems for additional sub-bass cabinets – e.g. F12+ + S15+, S18+ or S218+ combinations.

F15+



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The high power Blackline F15^{+} is a high performance, wide-bandwidth system in a compact and efficient package. Extended frequency response is provided by a new 15” (380mm) LF driver and a new 1.4” (35mm) exit compression driver mounted on a rotatable 80° x 50° constant directivity HF horn.

The new LF driver features a tough, water resistant cone and a lightweight, high BL, neodymium motor system with inside/outside coil windings for improved heat transfer. An aluminium demodulating ring reduces distortion and improves midrange clarity at high levels and increased excursion is available via a triple roll surround and deep motor structure.

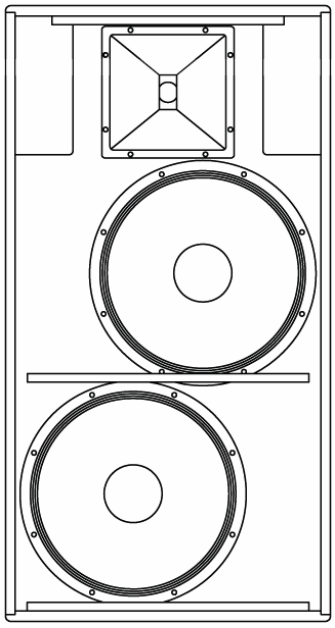
The new HF driver utilises a titanium diaphragm with controlled break-up modes for improved sonic performance at high frequencies and the crossover design and LF cone profile have been optimised to match the directivity of the HF horn and LF section through the crossover region.

The F15^{+} may be used with or without a system controller. For demanding applications, Martin Audio recommends an M3^{+}, DX1, DX2 or Engineer system controller configured to perform EQ and limiter functions.

The M3^{+}, DX1, DX2 or Engineer system controller may also be used to configure systems for additional sub-bass cabinets – e.g. F15^{+} + S18^{+} or S218^{+} combinations.

3.2 2-way dual-lf, full-range system

F215^{+}



The Blackline F215^{+} is a two-way passive, trapezoidal enclosure with dual 15” (380mm)/3” (75mm) voice coil low frequency drivers and a 1.4” (35mm) exit titanium diaphragm compression driver, mounted on a proprietary, rotatable, 80° x 50° constant directivity horn.

Below 250Hz, both LF drivers operate together to produce low frequencies, whilst above 250Hz, only the upper LF driver is used to reproduce the midrange up to the crossover point. This technique avoids the uneven response which would occur if both drivers were allowed to operate together over the mid-band.

Each of the two new LF drivers features a tough, water resistant cone and a lightweight, high BL, neodymium motor system with inside/outside coil windings for improved heat transfer. An aluminium demodulating ring improves the midrange performance at high levels and increased excursion is available via a triple roll surround and deep motor structure.

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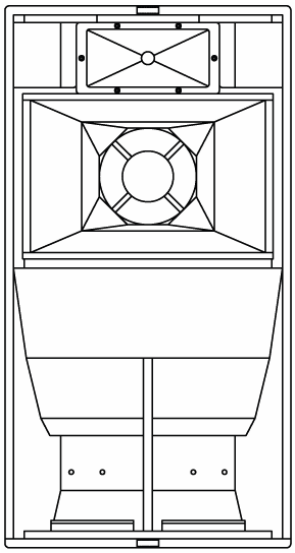
The F215+ may be used with or without a system controller. For demanding applications, Martin Audio recommends an M3+, DX1, DX2 or Engineer system controller configured to perform EQ and limiter functions.

The M3+, DX1, DX2 or Engineer system controller may also be used to configure systems for additional sub-bass cabinets – e.g. F215+ + S218+ combinations.

3.3 3-way horn-loaded, full range systems

H3+ and **H3T+**



The Blackline H3+ and H3T+ are very high performance, vertically formatted, all-horn, three-way systems in a single, wide-bandwidth package. They differ only in drive configuration. The H3+ is bi-amplified whilst the H3T+ offers user selectable bi-amplified or tri-amplified modes.

New drivers have been developed for improved performance in all bands. The Hybrid™ low frequency section comprises a horn-loaded 15” (380mm)/4” (100mm) voice coil driver that is reflex loaded to extend the LF output to below the natural cut-off point of the horn.

The new LF driver features a water resistant cone and triple roll surround for increased excursion.

The H3+/H3T+ mid horn has a unique ‘phase-ball’ loading device which maintains the constant directivity characteristics of the horn at the upper end of its range. It is driven by a new 10” (250mm) midrange driver with an aluminium demodulating ring for improved high-mid clarity and reduced distortion when driven hard.

The 70° x 40° H3+/H3T+ HF section features a neodymium 1” (25mm) exit compression driver with a Kapton diaphragm for high sensitivity and extended HF performance. The internal mid/high passive crossover allows this three-way system to be driven in a bi-amp configuration.

The H3+ is bi-amplified and must be used with a system controller. Martin Audio M3+, DX1, DX2 or Engineer system controllers may be configured to provide the recommended 2-way crossover and limiter functions.

Martin Audio DX1, DX2 or Engineer - or series connected M3+ system controllers - may also be used to configure H3+ or H3T+ systems for additional sub-bass cabinets – e.g. H3+ + S218+ combinations.

The H3T+ can be driven like an H3+ when in bi-amplified mode. In tri-amplified mode the H3T+ must be used with a Martin Audio DX1, DX2 or Engineer system controllers to provide the recommended 3-way crossover and limiter functions.

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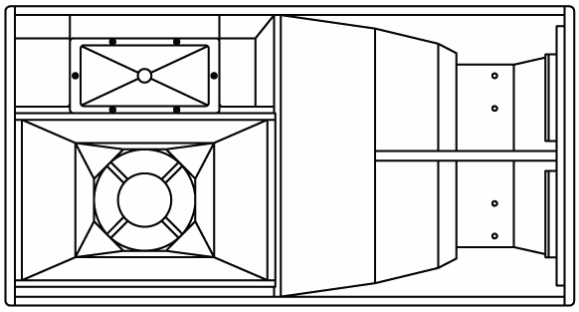
H3H+



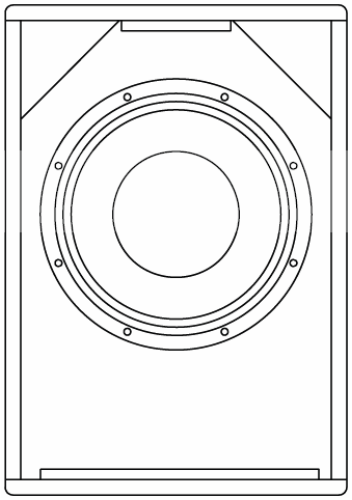
The Blackline H3H+ is a very high performance, all-horn, three-way system in a single, wide-bandwidth package. The H3H+ offers all the attributes of the standard H3+ but is horizontally formatted making it suitable for venues with restricted ceilings height.

The H3H+ is bi-amplified and must be used with a system controller. Martin Audio M3+, DX1, DX2 or Engineer system controllers may be configured to provide the recommended 2-way crossover and limiter functions.

Martin Audio DX1, DX2 or Engineer - or series connected M3+ system controllers - may also be used to configure H3H+ systems for additional sub-bass cabinets – e.g. H3H+ with S218+.

3.4 Sub-bass systems

S12+



The Blackline S12+ is an extremely compact sub-bass system. It has been designed for use with the F8+ and F10+ full-range loudspeakers in situations where extended low frequency output and increased system headroom are required.

The S12+ has an integral, user-selectable 120Hz passive crossover. When switched to Passive mode, the S12+ may be parallel-connected to F8+ or F10+ systems to provide low frequency extension without the need for an additional amplifier.

An M3+, DX1, DX2 or Engineer system controller may also be used to provide an active crossover with enhanced control facilities.

The S12+ is provided with a top hat fitting that can be used to pole mount an F8+ or F10+ above the enclosure.

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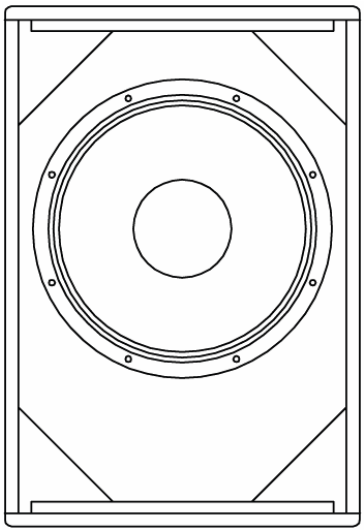
S15+



The compact Blackline S15+ sub-bass system has been designed to be used with Blackline F12+ or F15+ full-range systems to extend and increase the total low frequency output power.

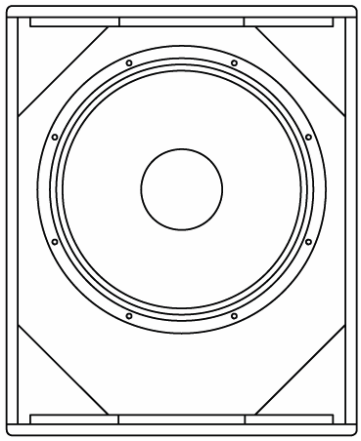
The S15+ provides good bass punch from a new, long-excursion, 15” (380mm)/4” (100mm) voice coil driver with a water resistant cone and triple roll surround.

The S15+ has an integral, user-selectable 120Hz passive crossover. When switched to Passive mode, the S15+ may be parallel-connected to F8+, F10+ or F12+ systems to provide low frequency extension without the need for an additional amplifier.

An M3+, DX1, DX2 or Engineer system controller may also be used to provide an active crossover with enhanced control facilities.

The S15+ is provided with a top hat fitting that can be used to pole mount an F8+, F10+, or F12+ above the enclosure

S18+



The compact Blackline S18+ sub-bass system has been designed to be used with Blackline F12+ and F15+ full-range systems to extend and increase the total low frequency output power.

The S18+ provides good bass punch with extended sub-bass output from a new, long-excursion, 18” (460mm)/4” (100mm) voice coil driver with a water resistant cone and triple roll surround.

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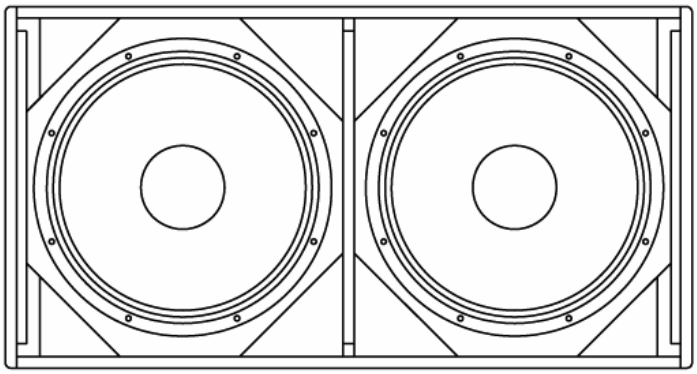
The S18+ has an integral, user-selectable 120Hz passive crossover. When switched to Passive mode, the S18+ may be parallel-connected to F8+, F10+, F12+ or F15+ systems to provide low frequency extension without the need for an additional amplifier.

An M3+, DX1, DX2 or Engineer system controller may also be used to provide an active crossover with enhanced control facilities.

The S18+ is provided with a top hat fitting that can be used to pole mount an F8+, F10+, F12+ or F15+ above the enclosure.

S218+



The powerful Blackline S218+ sub-bass system has been designed to be used with large scale Blackline F12+ and F15+ systems to extend and increase the total low frequency output power. It can also be used as the low frequency section of a bi-amplified/tri-amplified H3+/H3T+ system.

The S218+ provides good bass punch with extended sub-bass output from two new, long-excursion, 18" (460mm)/4" (100mm) voice coil drivers with water resistant cones and triple roll surrounds.

The S218+ is designed to be used as part of a high power active system. It must be electronically crossed over with a Martin Audio M3+, DX1, DX2 or Engineer system controller.

3.5 Grille removal

To remove the grille, first remove any grille retaining screws. The grille can then be removed by inserting a flat bladed screwdriver under one of the notches at the top and bottom of the grille and gently levering the grille out of the side channels.

4 Safety first

It is important that loudspeaker systems are used in a safe manner. Please take some time to review the following points concerning safe use of Blackline Series loudspeakers.

Professional loudspeakers are capable of producing extremely high sound levels and should be used with care. Hearing loss is cumulative and can result from levels above 90dB if people are exposed for a long period.

Never stand close to loudspeakers driven at high level.

4.1 Pole or stand mounting

Blackline+ full-range loudspeakers incorporate pole mounting ("top hat") sockets so that they may be pole or stand mounted.

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When using poles or stands, the following precautions are advised:

- Ensure that the stand will support the weight of the speaker by checking the stand manufacturers rating. (See the Section 10 – Technical Specifications - for individual Blackline+ weights and dimensions)
- Make sure that the stand is placed on a level surface and that its legs are fully extended
- Do not place more than one speaker on each stand
- Run cables so that they do not present a trip hazard which could pull the speaker over
- When used outdoors in the wind, it may be necessary to add some weight to the base of the stand
- When using a pole mount with a sub-bass system, observe similar precautions.

4.2 Stacking

- Ensure that the floor or stage is level and solid
- Do not stack speakers too high outdoors where winds could topple the stack
- Be aware that speakers producing very high power levels can move or creep. To avoid this, place friction material between the floor and speaker and between each speaker.

4.3 Rigging and suspension

WARNING:
Suspending the system should only be done by qualified personnel following safe rigging practices. Secure fixings to the building structure are vital. Seek help from architects, structural engineers or other specialists if in any doubt.

Blackline+ Series enclosures are designed for portable applications, but can be suspended singly by means of the threaded inserts provided.
Enclosures are fitted internally with steel corner reinforcement brackets, where necessary, to ensure that each cabinet is strong enough to be hung from its top.

- Never suspend one enclosure from another to form an array or cluster using these fittings
- The common practice of using commercially available eye bolts for suspension should only be undertaken with great caution. Only forged shoulder eye bolts should be considered and it is important that the thread length is at least 30mm
- Formed eye bolts i.e. those which are formed from a steel rod bent into an eye are not recommended
- A flat washer should be inserted between the eyebolt and the enclosure
- Eye bolts are strongest along the thread axis. Angling the enclosure will result in an angle pull and it is important to use eye bolts that are safe in these circumstances.

5 Amplification

Choosing a power amplifier
Martin Audio loudspeakers are capable of recreating musical dynamics accurately and with incredible impact if powered correctly. Martin Audio loudspeaker power ratings are quoted for ***AES*** power - a long-term average power rating, and ***Peak*** power – a short-term burst capability.

Moving coil loudspeakers can be run up to their ***AES*** power rating continuously and up to the higher ***Peak***

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power rating for transient musical peaks.

1) Choose amplifiers capable of delivering the loudspeaker's ***Peak*** power rating – see below

2) For good spectral balance, set your amplifiers to the same voltage gain throughout the system. A common industry standard voltage gain is 32dB (x40). Crown have a 26dB (x20) standard. Always check the amplifier ***gain*** settings – these are usually on the rear panel. Avoid using ***sensitivity*** settings as these give different gains depending on the amplifier's power specification.

3) Use the M3$^+$'s carefully timed limiters to avoid exceeding the ***AES*** long-term power rating.

Important: See section 10 for limiter setting information

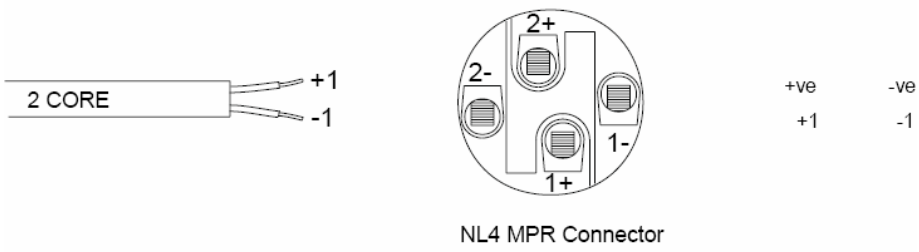
This policy avoids clipping transient peaks. Clipping not only sounds unacceptable but can seriously stress your system by dumping large amounts of distortion into the high frequency drivers.

Blackline$^+$ model	**Peak power rating**	**Suggested power amplifier**	
		Minimum	**Recommended**
F8$^+$	600W into 8Ω	MA1.3s	MA1.6s/ MA4.8Q*
F10$^+$/ F12$^+$	1.2KW into 8Ω	MA1.6s/ MA4.8Q*	MA2.8s/ MA6.8Q*
F15$^+$	1.6KW into 8Ω	MA2.8s	MA4.2s
F215$^+$	3.2KW into 4Ω	MA2.8s	MA4.2s
H3$^+$/ H3H$^+$	LF: 3KW into 8Ω MF-HF: 1.2KW into 8Ω	MA2.8s MA1.6s	MA4.2s MA2.8s
H3T$^+$	LF: 3KW into 8Ω MF: 1.2KW into 8Ω HF: 400W into 8Ω	MA2.8s MA1.6s MA1.3s	MA4.2s MA2.8s MA1.6s
S15$^+$	1.6KW into 8Ω	MA4.2s	MA9.6K
S18$^+$	3KW into 8Ω	MA12K	MA18K
S218$^+$	6KW into 4Ω	MA12K	MA18K

(*MA4.8Q & MA6.8Q are 4ch installation amplifiers featuring remote monitoring and power on/off facilities)

6 Connections

Each connector panel has two Neutrik Speakon connectors wired in parallel with each other. The second connector allows use of a short link lead to power another, parallel Blackline$^+$ loudspeaker. The connectors are wired as follows:



F8$^+$, F10$^+$, F12$^+$, F15$^+$, F215$^+$, S12$^+$, S15$^+$, S18$^+$ NL4 connection

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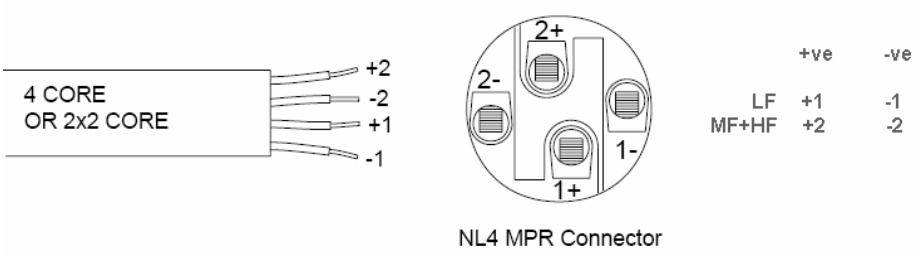
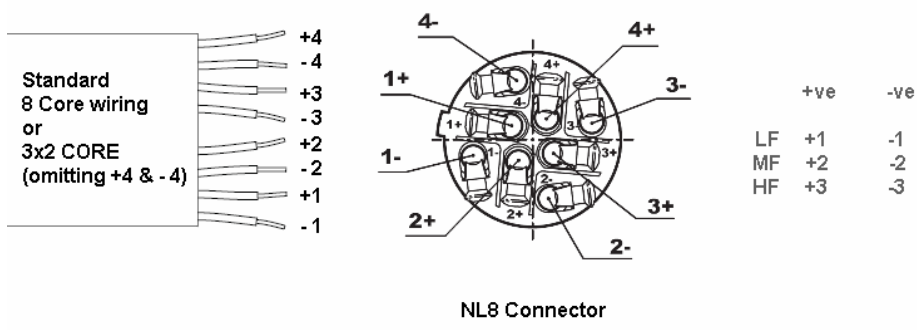
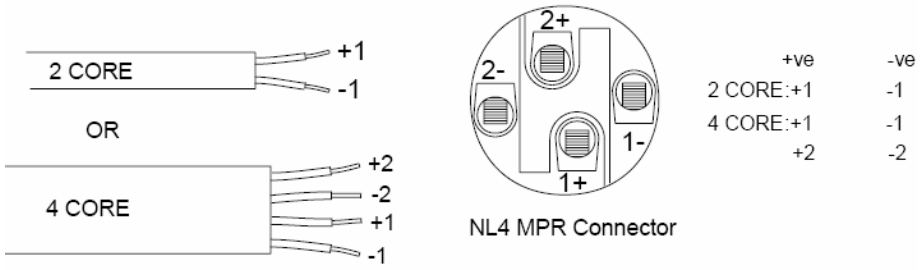


H3^{+}, H3H^{+} NL4 bi-amplified connection



H3T^{+} NL8 tri-amplified connection



S218^{+} NL4 connection

Note: +1 is connected to +2 and -1 is connected to -2 inside the S218^{+} to allow 4-core cable users to double the copper area, and, therefore, reduce power losses.

7 Cable lengths

When connecting Blackline^{+} systems to an amplifier, it is recommended that the return resistance of the cable used is less than one tenth of the nominal impedance of the system or systems in parallel. The table below gives an indication of the maximum permissible cable runs for various conductor cross-sectional areas.

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Conductor CSA	Maximum Cable Run		
	4 ohms	8 ohms	16 ohms
1.0mm^2	11m	22m	44m
1.5mm^2	17m	34m	68m
2.0mm^2	22m	44m	88m
2.5mm^2	29m	58m	116m
4.0mm^2	44m	88m	176m
6.0mm^2	66m	132m	264m

8 Recommended controllers

Because the F8$^+$, F10$^+$, F12$^+$, F15$^+$, F215$^+$, S12$^+$, S15$^+$ and S18$^+$ are passive systems embodying correct acoustic design principles, they can be used without a controller as long as their AES and peak power ratings are not exceeded and care is taken to avoid amplifier clipping.

- For maximum performance, however, we recommend that Blackline$^+$ Series systems are used with Martin Audio ***M3***$^+$, ***DX1***, ***DX2*** or ***Engineer*** system controllers.
- Controllers must, of course, be used with the bi-amplified H3$^+$, and H3H$^+$ and the bi-amplified/tri-amplified H3T$^+$. Controllers must also be used when adding the S218$^+$ to a system as this very high power subwoofer does not include a passive low-pass network.

8.1 M3$^+$ 2 input, 4 output analogue system controller

The Martin Audio M3$^+$ 2in-4out system controller provides optimised crossover, EQ and limiter functions for bi-amplified Blackline$^+$ configurations (H3 or H3H), or for main-plus-subwoofer configurations (for instance, F8$^+$ + S12$^+$, F10$^+$ + S15$^+$, F12$^+$ + S18$^+$ or F15$^+$ + S218$^+$).

The M3$^+$ system controller may also be used as a simple equaliser and limiter for fully passive full-range Blackline$^+$ applications.

Please refer to the M3$^+$ configuration notes later in this user guide for further information.

8.2 DX1 2 input, 6 output digital loudspeaker management system

The DX1 is a powerful 2in-6out DSP based audio processing unit for live applications and fixed installations.

The unit is configurable in 5 basic modes (2x2 way, 2x3 way, 4 way, 5 way and 6 way crossover). Each input has adjustable gain and delay. Each output consists of a high and low pass filter, 5 bands of parametric equalisaton, limiter, delay (adjustable in 2.6 µs steps), gain and polarity controls.

DX1 system controllers are supplied pre-loaded with a wide range of Martin Audio presets. Blackline+ presets are available as binary files from www.martin-audio.com for loading via a pc.

Please refer to the DX1 user's guide for further information.

8.3 DX2 4 input, 8 output digital loudspeaker management system

The new 4in-8out DX2 embraces the very latest advances in technology to meet the ever increasing demand and expectations placed on professional audio systems. Based on a completely new processing platform, running at 96kHz, the DX2 sets a new standard in terms of performance, flexibility and ease of use.

The DX2 is a comprehensive digital loudspeaker management system, capable of being easily configured to meet the most demanding applications in both fixed installation and live touring environments.

DX2 system controllers are supplied pre-loaded for a variety of Martin Audio live sound products. Blackline+

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presets are available as binary files from www.martin-audio.com for loading via a pc.

Please refer to the DX2 user's guide for further information.

8.4 Engineer Installed system digital management processor

The Martin Audio Engineer 4in/8out and 8in/8out digital management processors provide comprehensive control and management of installed loudspeaker systems.

In addition to crossover, EQ and limiter functions, Engineer processors offer a flexible event scheduler, automatic programme level and tonality control to compensate for variations in programme sources and a unique psycho-acoustical BassCreator algorithm.

BassCreator is capable of extending the perceived range of small loudspeakers 1 to 1½ octaves below the resonance frequency of a loudspeaker without overloading the loudspeaker and without creating sub-sonic sound leakage.

Engineer processors are supplied pre-loaded with a limited range of Martin Audio presets. Blackline+ presets will be made available shortly from www.martin-audio.com for loading via a pc.

A note on the illustrations

Please note that for simplicity only the left channel is shown and each line in the diagram represents a pair of wires.

The illustrations show systems configured using the cost-effective Martin Audio M3$^+$ controller. Larger, zoned systems may require the more comprehensive facilities offered by Martin Audio digital controllers like the DX1, DX2 or Engineer. See above for details.

The M3$^+$ controller's internal crossover card must be properly configured for the system to be used. Please see the ***M3$^+$ configuration notes*** later in this user guide for further information.

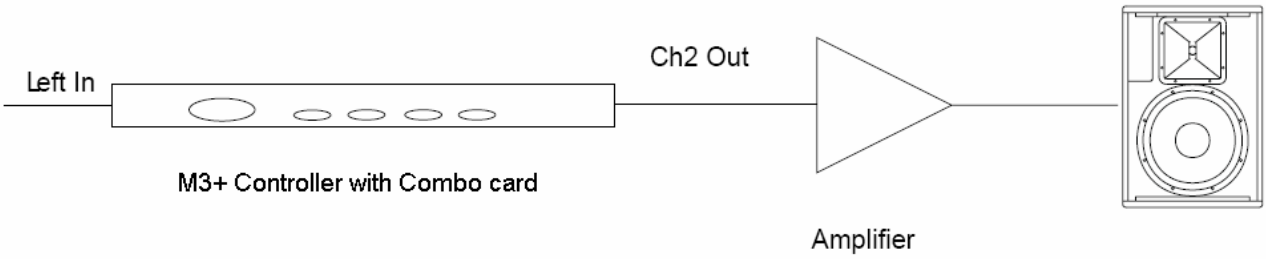
9 System configurations

There are many different system combinations possible with the Blackline$^+$ Series. Some typical configurations illustrations are shown below.

Main-to-subwoofer ratios

The number of full-range or mid/high systems required to match the efficiency of one sub-bass system is shown where applicable.

9.1 Passive systems



F8$^+$, F10$^+$, F12$^+$ or F15$^+$ passive system set-up (F12$^+$ shown)

- The **F215$^+$** may also be used like this – but with an **M3$^+$ F215$^+$** card in place of the ***Combo card***
- The M3$^+$ front panel and internal Combo card must be set for ***Full-range*** operation for this passive, full-range configuration.
- See M3$^+$ configuration notes later.

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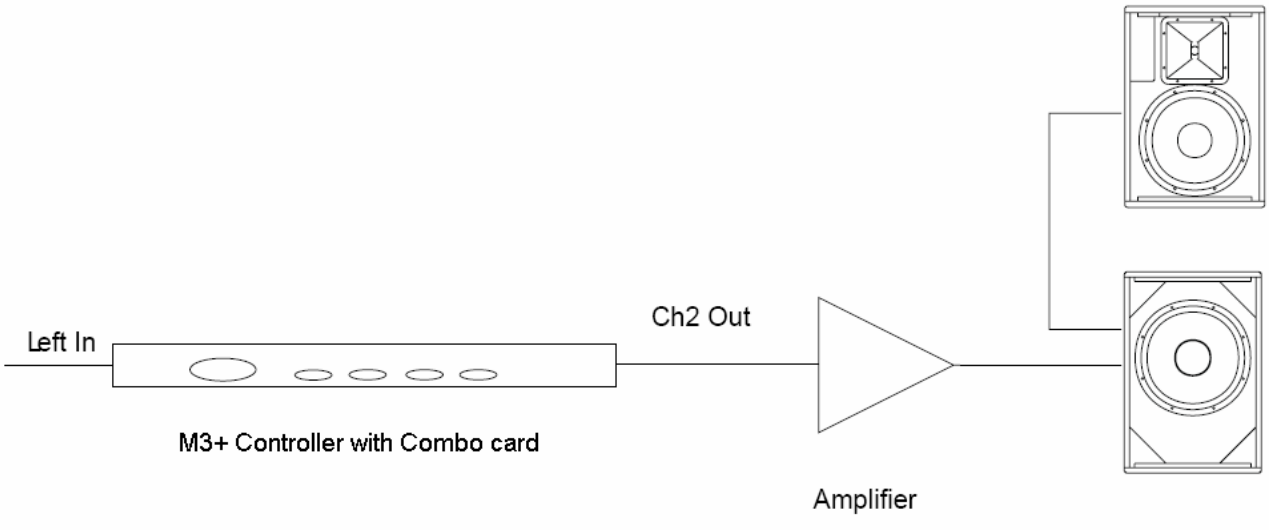
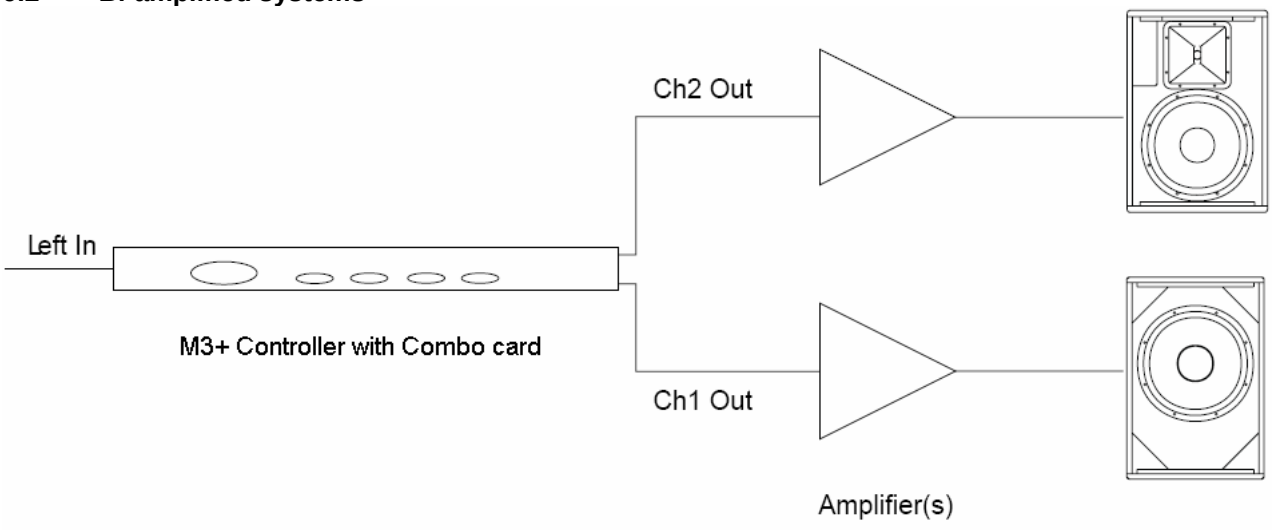


F8+, F10+, F12+ or F15+ plus S12+, S15+ or S18+ passive system set-up (F12+ & F15+ shown)
(Typical main-to-sub ratio 1:1)

- The M3+ front panel and internal Combo card must be set for ***Full-range*** operation and the subwoofer rear switch set to ***Passive*** for this configuration to work correctly.
- See M3+ configuration notes later.

9.2 Bi-amplified systems



Typical F8+, F10+, F12+ or F15+ plus S12+, S15+ or S18+ active system set-up (F12+ & F15+ shown)
(Typical main-to-sub ratio 1:1)

- The M3+ front panel and internal Combo card must be set for ***With Sub*** operation and the subwoofer rear switch set to ***Active*** for this configuration to work correctly.
- See M3+ configuration notes later.

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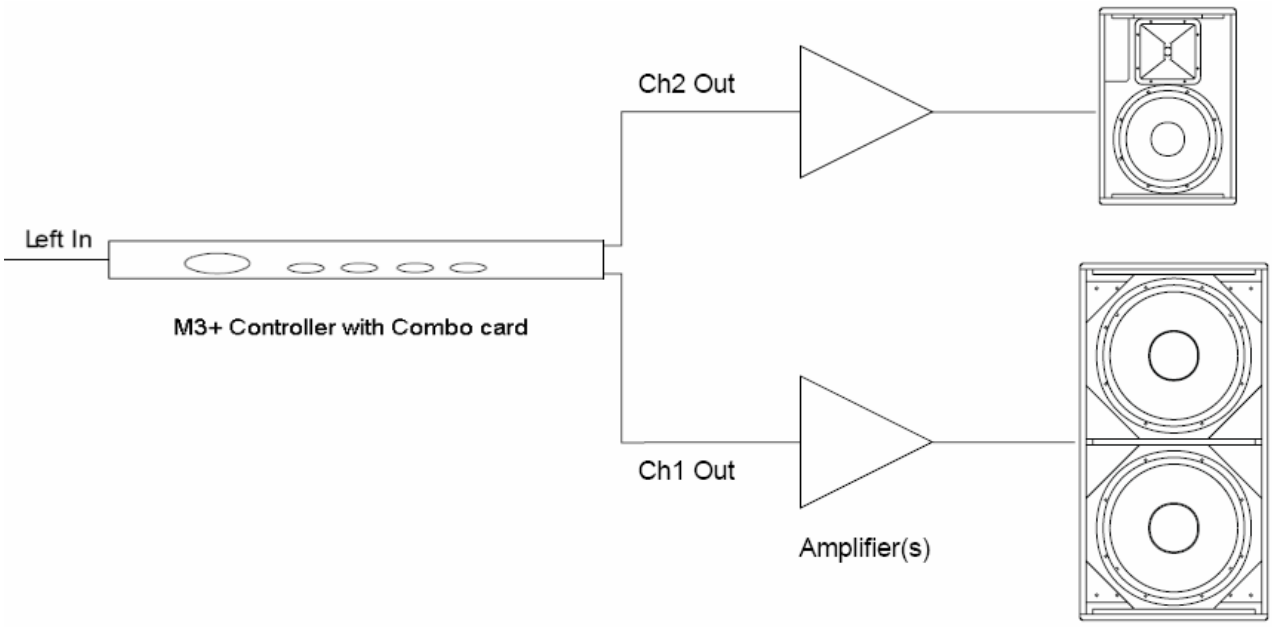
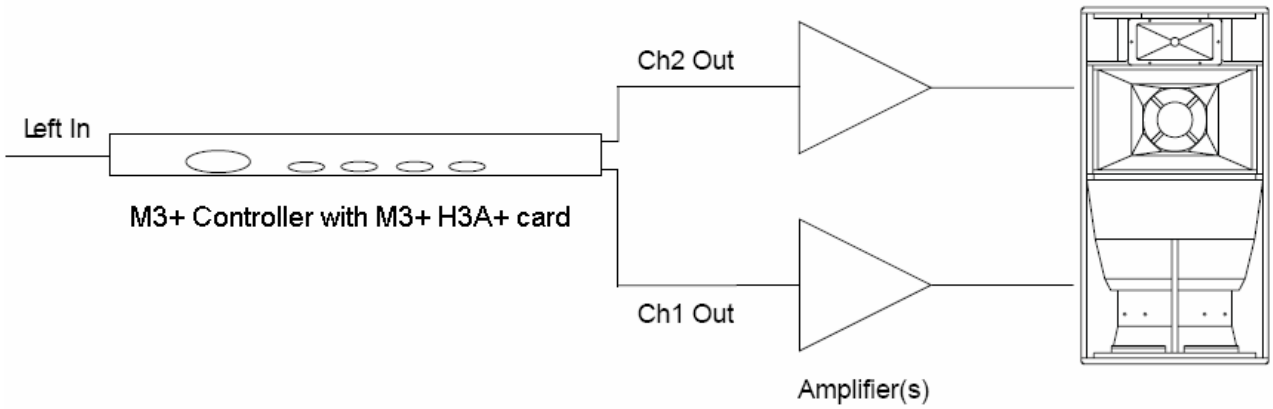


Typical F8^{+}, F10^{+}, F12^{+} or F15^{+} plus S218^{+} active system set-up (F12^{+} & S218^{+} shown)
(Typical main-to-sub ratio 2:1)

- The **F215^{+}** may also be used like this – but with an **M3^{+} F215^{+}** card in place of the ***Combo card***
- The M3^{+} front panel and internal Combo card must be set for ***With Sub*** operation for this active configuration.
- See M3^{+} configuration notes later.



H3^{+}, H3H^{+} or H3T^{+} bi-amplified system set-up (H3^{+} shown)

- The M3^{+} front panel must be set for ***Full-range*** operation for this active configuration.
- See M3^{+} configuration notes later.

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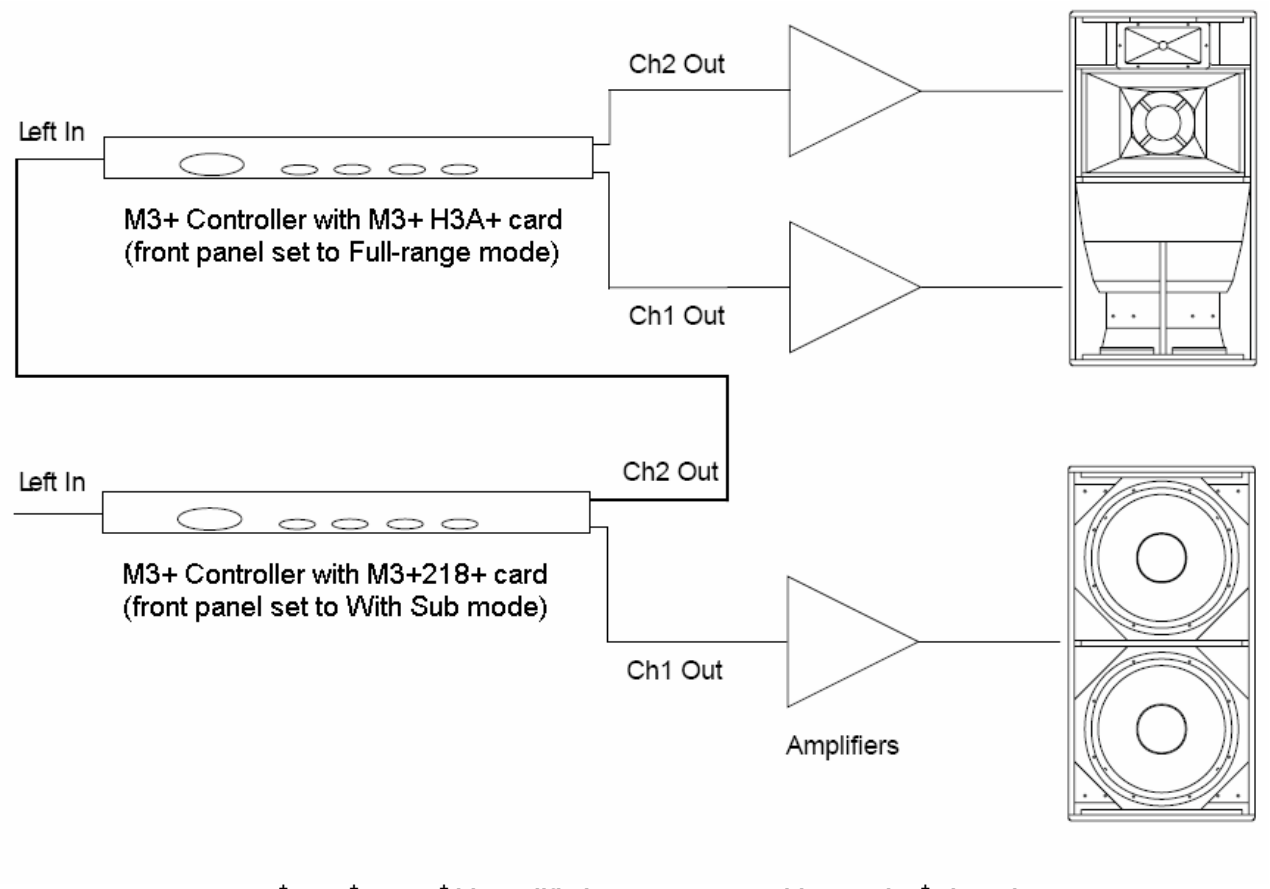
9.3 Tri-amplified systems



H3$^+$, H3H$^+$ or H3T$^+$ bi-amplified system set-up with S218 (H3$^+$ shown)

- The first (lower) M3$^+$ front panel must be set to ***With Sub*** to provide an H3$^+$/H3H$^+$/H3T$^+$-to-S218$^+$ crossover and the second (upper) M3$^+$ front panel must be set to ***Full-range*** operation for a bi-amplified H3$^+$/H3H$^+$/H3T$^+$ crossover.
- See M3$^+$ configuration notes later.

An alternative approach for these more complex designs is to use the Martin Audio ***DX1*** digital 2 input, 4 output controllers which come fully loaded with a many Martin Audio presets including settings suitable for Blackline$^+$ combinations.

Further operational choices include a 4 input, 8 output ***DX2*** digital controller or a choice of 4 input, 8 output or 8 input, 8 output digital management processors called ***Engineer***. The Engineer offers a flexible event scheduler, automatic programme level and tonality control to compensate for variations in programme sources and a unique psycho-acoustical BassCreator algorithm.

See Section 8 (earlier in this document) for further information.

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10 M3+ Configuration

10.1 Front panel *With Sub* mode

To keep things simple, select ***With Sub*** mode when using subwoofers, ***Full Range*** mode when running F8+, F10+, F12+ or F15+ loudspeakers without subwoofers and set the Combo Card jumpers to the relevant quick-start illustrations shown later in these notes.

10.2 Choosing a power amplifier

Martin Audio loudspeakers are capable of recreating musical dynamics accurately and with incredible impact if powered correctly. Martin Audio loudspeaker power ratings are quoted for ***AES*** power - a long-term average power rating, and ***Peak*** power – a short-term burst capability.

Moving coil loudspeakers can be run up to their ***AES*** power rating continuously and up to the higher ***Peak*** power rating for transient musical peaks.

- Choose an amplifier capable of delivering the loudspeaker's Peak power rating
- Use the M3+'s carefully timed limiters to avoid exceeding the AES long-term power rating.

This policy avoids clipping transient peaks. Clipping not only sounds unacceptable but can seriously stress your system by dumping large amounts of distortion into the high frequency drivers.

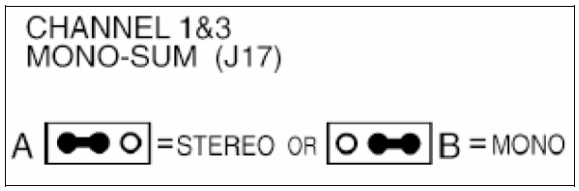
10.3 M3+ internal jumper configuration

The M3+ controller contains internal jumpers to cater for a variety of Blackline+ loudspeakers – including loudspeaker and subwoofer combinations.

Please note that these jumpers should be set by experienced electronics technicians only.

Mono Subwoofer operation

Move the motherboard jumper J17 to position B for mono subwoofer operation.



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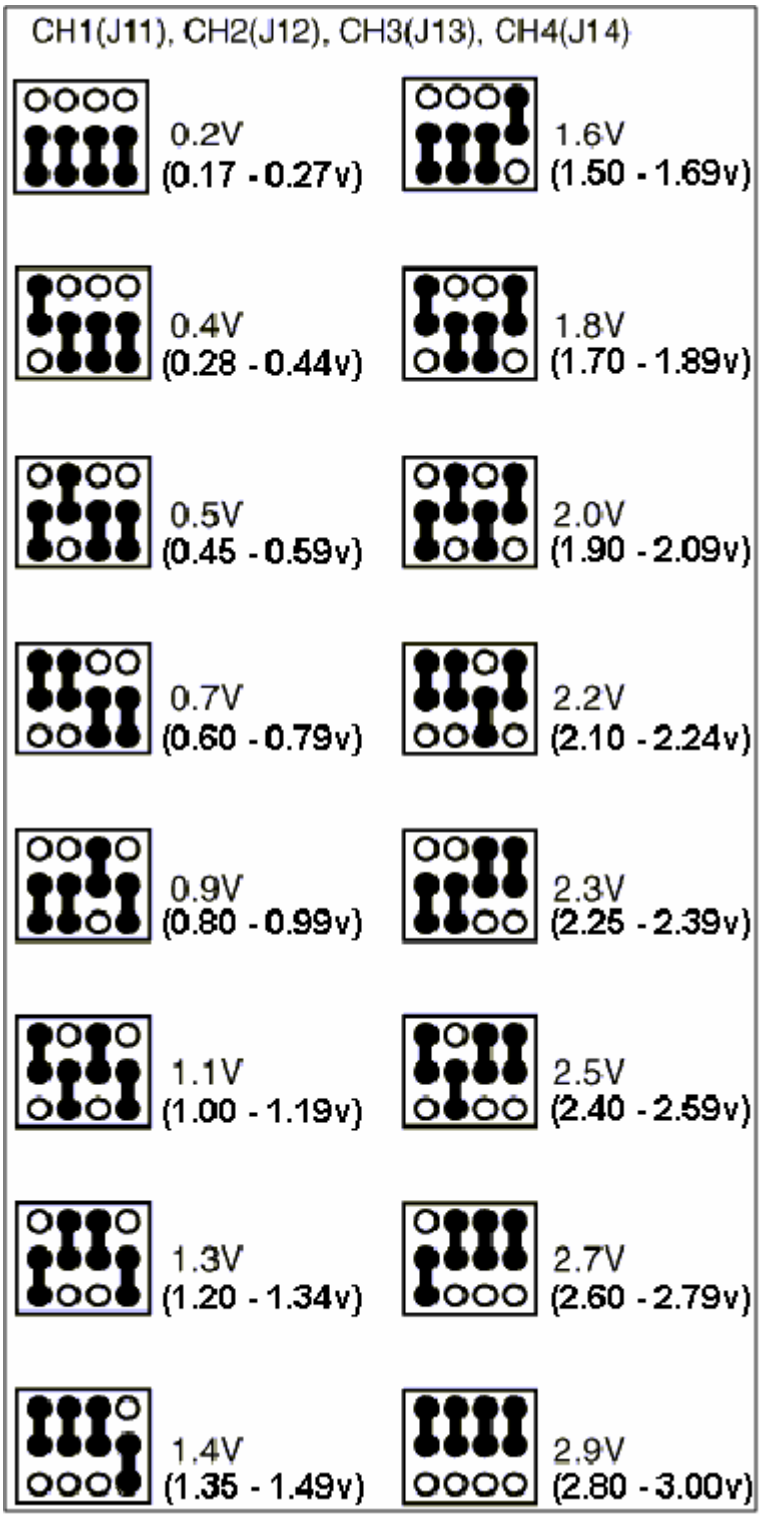
Limiter settings

Important: Set the motherboard output limiter jumpers Ch1-J11, Ch2-J12, Ch3-J13, Ch4-J14 to suit the recommended limiter thresholds (vs power amplifier gain) shown below:



Output channel limiter jumpers

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Output limiter thresholds vs power amplifier gain

(see next page if you know the amp's sensitivity but you do not know its gain)

rms voltage shown for easy M3+ set-up See "dBu & dBV" sheet to convert voltage to dBu or dBv	Loudspeaker		F8+ FR 8" + 1" (passive)	F10+ FR 10" + 1" (passive)	F12+ FR 12" + 1" (passive)	F15+ FR 15" + 1" (passive)	F215+ FR 2 x 15" + 1.4" (passive)	S12+ Sub 12" (act or pass)	S15+ Sub 15" (act or pass)	S18+ Sub 18" (act or pass)	S218+ Sub 2 x 18" (reqs 150Hz active lp)
	Rated Power (into)		(8R)	(8R)	(8R)	(8R)	(Note: 4R)	(8R)	(8R)	(8R)	(Note: 4R)
	AES		150	300W	300W	400W	800W	400W	750W	750W	1500W
	Peak		600	1200W	1200W	1600W	3200W	1600W	3000W	3000W	6000W
	Rated continuous voltage		38vrms	49vrms	49vrms	57vrms	57vrms	57vrms	78vrms	78vrms	78vrms
Amplifier gain in dB	Amplifier gain as Vout/Vin										
(If amplifier gain not known see gain vs power and sensitivity sheet)	(If amplifier gain not known see gain vs power and sensitivity sheet)	Limiter timing Attack ▶ Release ▶	16ms 256ms	16ms 256ms	45ms 720ms	45ms 720ms	45ms 720ms	45ms 720ms	45ms 720ms	45ms 720ms	45ms 720ms
▼	▼										
42dB	x126		0.28v	0.39v	0.39v	0.45v	0.45v	0.45v	0.62v	0.62v	0.62v
41dB	x112	Controller o/p	0.31v	0.44v	0.44v	0.51v	0.51v	0.51v	0.70v	0.70v	0.70v
40dB	x100	limiter threshold	0.35v	0.49v	0.49v	0.57v	0.57v	0.57v	0.78v	0.78v	0.78v
39dB	x89	voltage vs	0.39v	0.55v	0.55v	0.64v	0.64v	0.64v	0.88v	0.88v	0.88v
38dB	x79	amplifier gain	0.44v	0.62v	0.62v	0.72v	0.72v	0.72v	0.99v	0.99v	0.99v
37dB	x71		0.49v	0.69v	0.69v	0.80v	0.80v	0.80v	1.10v	1.10v	1.10v
36dB	x63		0.56v	0.78v	0.78v	0.90v	0.90v	0.90v	1.24v	1.24v	1.24v
35dB	x56		0.63v	0.88v	0.88v	1.02v	1.02v	1.02v	1.39v	1.39v	1.39v
34dB	x50		0.70v	0.98v	0.98v	1.14v	1.14v	1.14v	1.56v	1.56v	1.56v
33dB	x45		0.78v	1.09v	1.09v	1.27v	1.27v	1.27v	1.73v	1.73v	1.73v
32dB	x40		0.88v	1.23v	1.23v	1.43v	1.43v	1.43v	1.95v	1.95v	1.95v
31dB	x35		1.00v	1.40v	1.40v	1.63v	1.63v	1.63v	2.23v	2.23v	2.23v
30dB	x32		1.09v	1.53v	1.53v	1.78v	1.78v	1.78v	2.44v	2.44v	2.44v
29dB	x28		1.25v	1.75v	1.75v	2.04v	2.04v	2.04v	2.79v	2.79v	2.79v
28dB	x25		1.40v	1.96v	1.96v	2.28v	2.28v	2.28v	3.12v	3.12v	3.12v
27dB	x22		1.59v	2.23v	2.23v	2.59v	2.59v	2.59v	3.55v	3.55v	3.55v
26dB	x20		1.75v	2.45v	2.45v	2.85v	2.85v	2.85v	3.90v	3.90v	3.90v
25dB	x18		1.94v	2.72v	2.72v	3.17v	3.17v	3.17v	4.33v	4.33v	4.33v
24dB	x16		2.10v	3.06v	3.06v	3.56v	3.56v	3.56v	4.88v	4.88v	4.88v

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		-7.8dBu (appx -10dBV)	-7dBu	-6dBu	-5dBu	-4dBu	-3dBu	-2dBu	-1dBu	0dBu	1dBu	2.21dBu (0dBV)	3dBu	4dBu	5.22dBu	6dBu	7dBu	8dBu	9dBu	10dBu
	I/P Sensitivity	0.317Vrms	0.34Vrms	0.39Vrms	0.44Vrms	0.49Vrms	0.55Vrms	0.62Vrms	0.69Vrms	0.775Vrms	0.87Vrms	1Vrms	1.09Vrms	1.23Vrms	1.41Vrms	1.55Vrms	1.73Vrms	1.95Vrms	2.18Vrms	2.45Vrms
Max o/p W(av)	Max o/p Vrms	Approx V Gain to nearest dB																		
100W into 4ohm (50W into 8ohm)	20Vrms	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18
125W into 4ohm (62.5W into 8ohm)	22.36Vrms	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
150W into 4 ohm (75W into 8ohm)	24.49Vrms	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
200W into 4ohm (100W into 8ohm)	28.28Vrms	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21
250W into 4ohm (125W into 8ohm)	31.62Vrms	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22
300W into 4ohm (150W into 8ohm)	34.64Vrms	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23
400W into 4ohm (200W into 8ohm)	40Vrms	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
500W into 4ohm (250W into 8ohm)	44.72Vrms	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
600W into 4ohm (300W into 8ohm)	48.99Vrms	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
750W into 4ohm (375W into 8ohm)	54.77Vrms	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
1,000W into 4ohm (500W into 8ohm)	63.25Vrms	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28
1,250W into 4ohm (625W into 8ohm)	70.71Vrms	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
1,500W into 4ohm (750W into 8ohm)	77.46Vrms	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30
2,000W into 4ohm (1,000W into 8ohm)	89.44Vrms	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31
2,500W into 4ohm (1,250W into 8ohm)	100Vrms	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32

Estimated power amplifier gain vs output specification & sensitivity

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10.4 Combo top card

For use with Blackline F8+, F10+, F12+, F15+, S12+, S15+, S18+ and S218+

Jumper settings

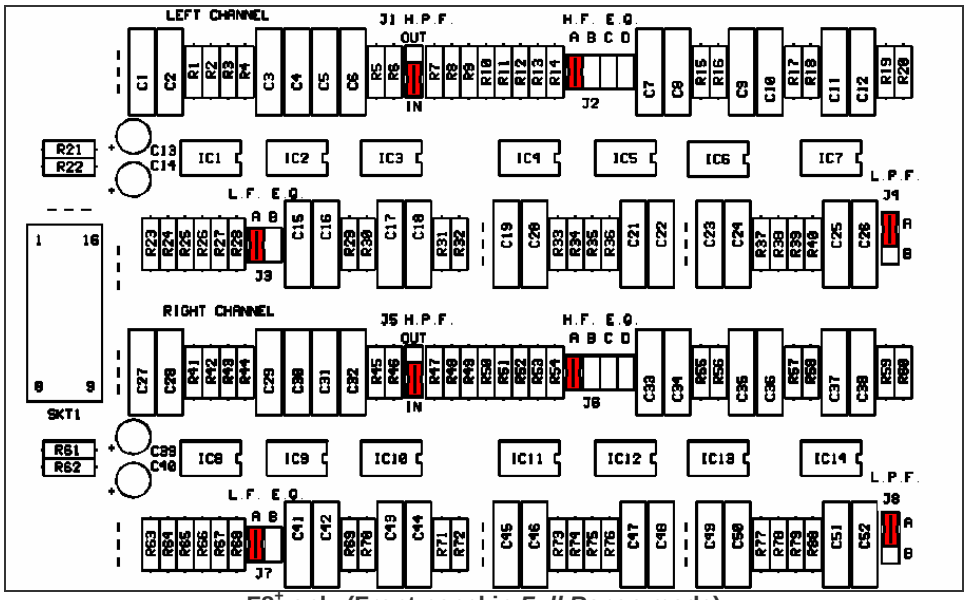
Important: Combo Card jumpers must be set to suit the Blackline+ loudspeaker system to be used.

Note again. These jumpers should be set by experienced electronics technicians only.

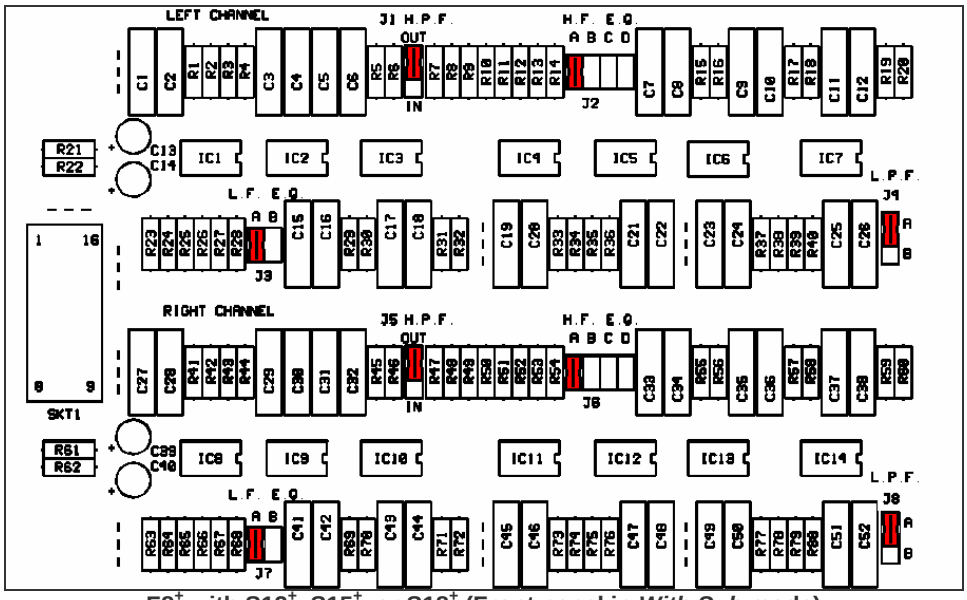
Remove the M3+ lid and locate the jumpers on the Combo Card. Use J1, J2, J5 & J6 to configure F8+, F10+, F12+ & F15+ and J3, J4, J7 and J8 to configure the M3+ for S12+, S15+, S18+ & S218+ as follows:

Quick-start illustrations

Set the M3+ Combo Card to suit the main or main/sub combination as shown in the following illustrations:



F8+ only (Front panel in *Full Range* mode)



F8+ with S12+, S15+, or S18+ (Front panel in *With Sub* mode)

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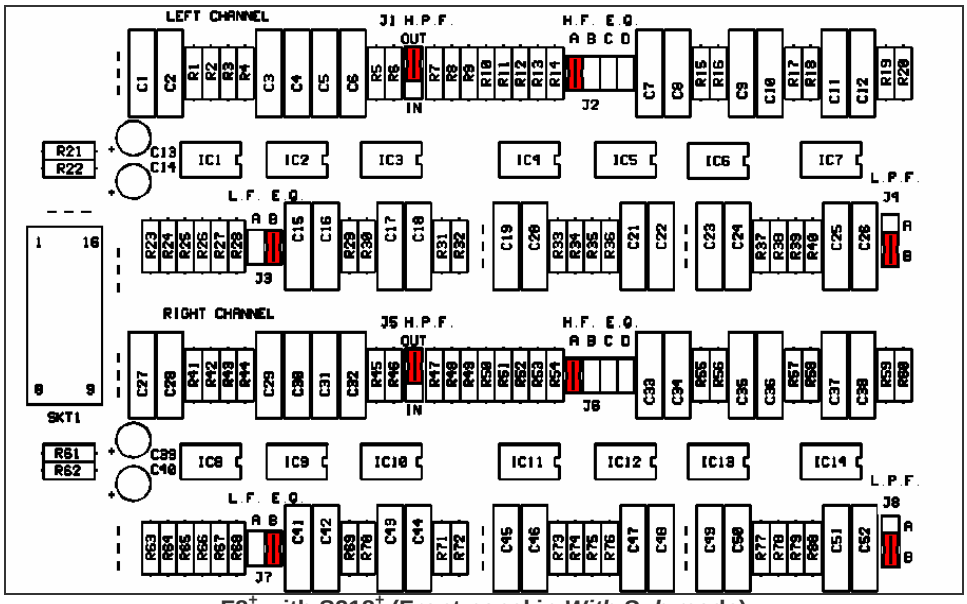
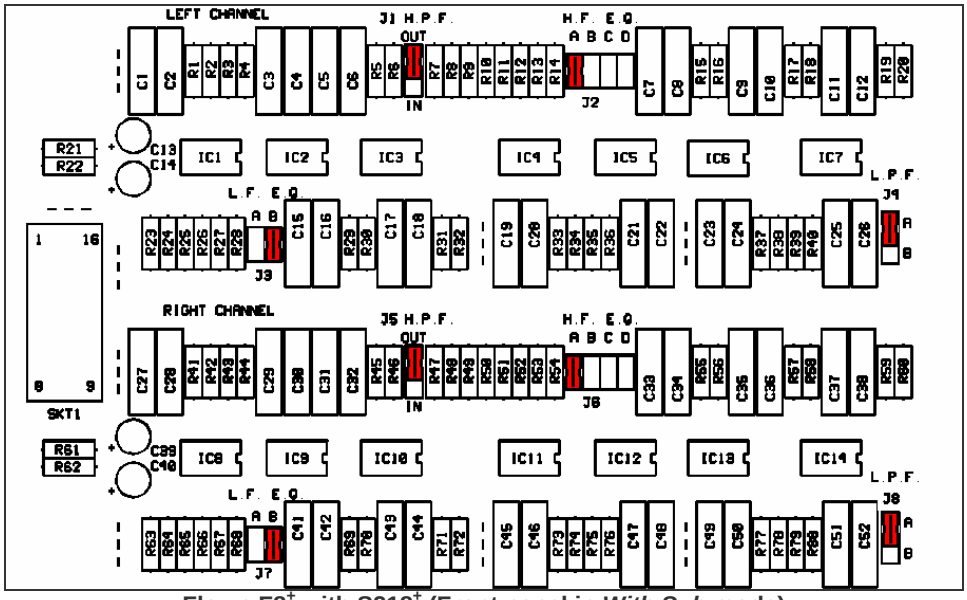


F8[+] with S218[+] (Front panel in *With Sub* mode)



Flown F8[+] with S218[+] (Front panel in *With Sub* mode)

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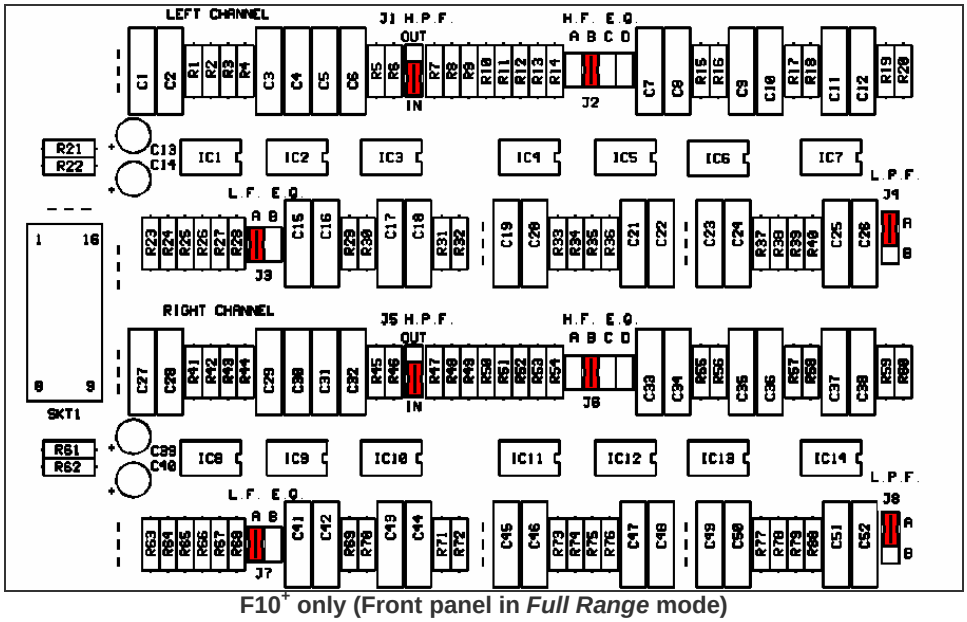
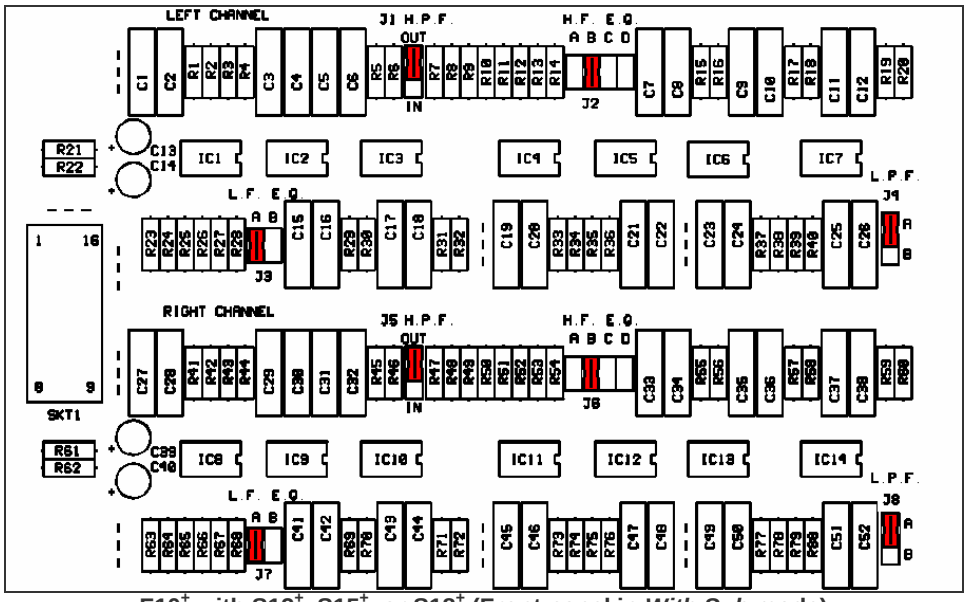


F10[+] only (Front panel in *Full Range* mode)



F10[+] with S12[+], S15[+], or S18[+] (Front panel in *With Sub* mode)

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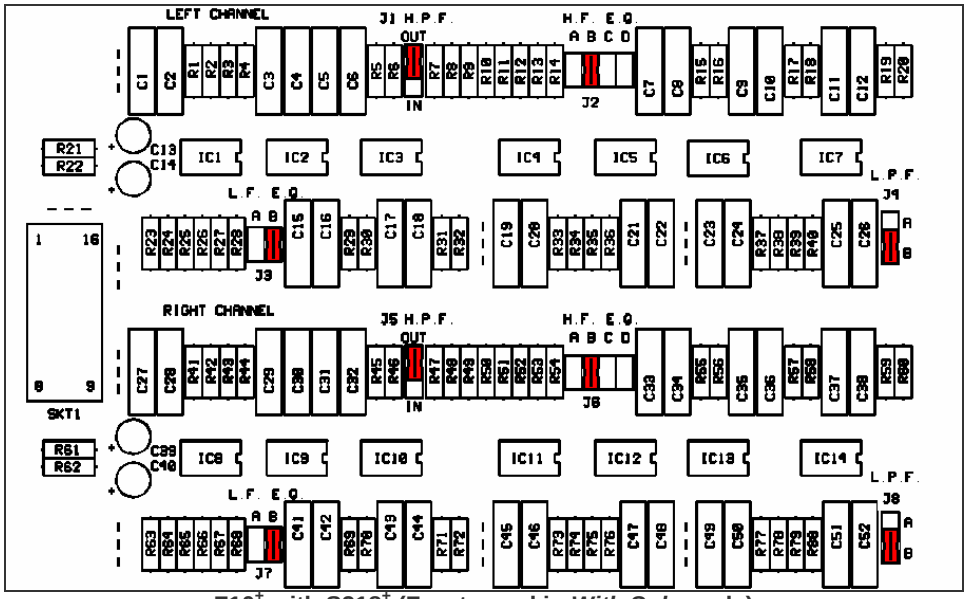
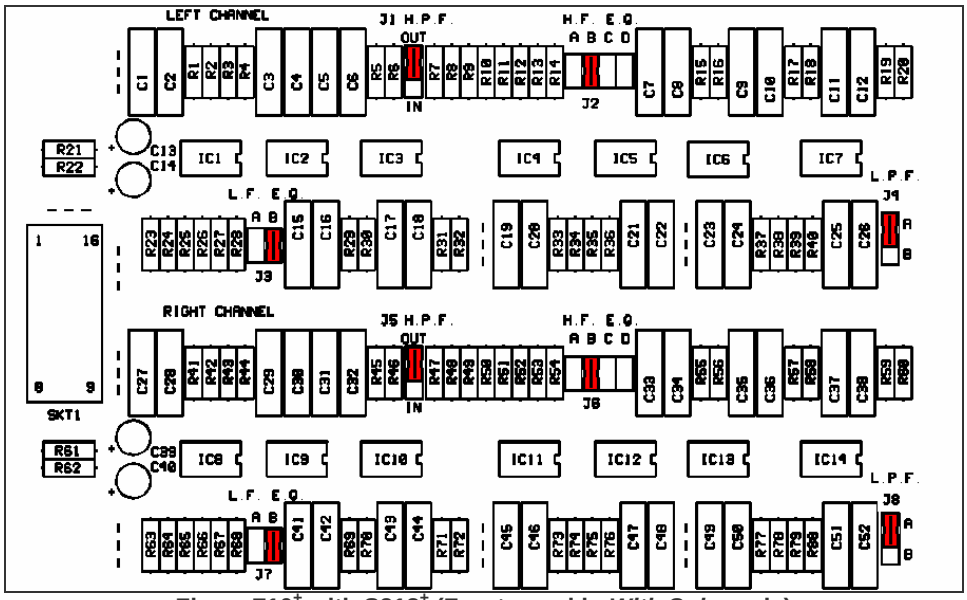


F10+ with S218+ (Front panel in *With Sub* mode)



Flown F10+ with S218+ (Front panel in *With Sub* mode)

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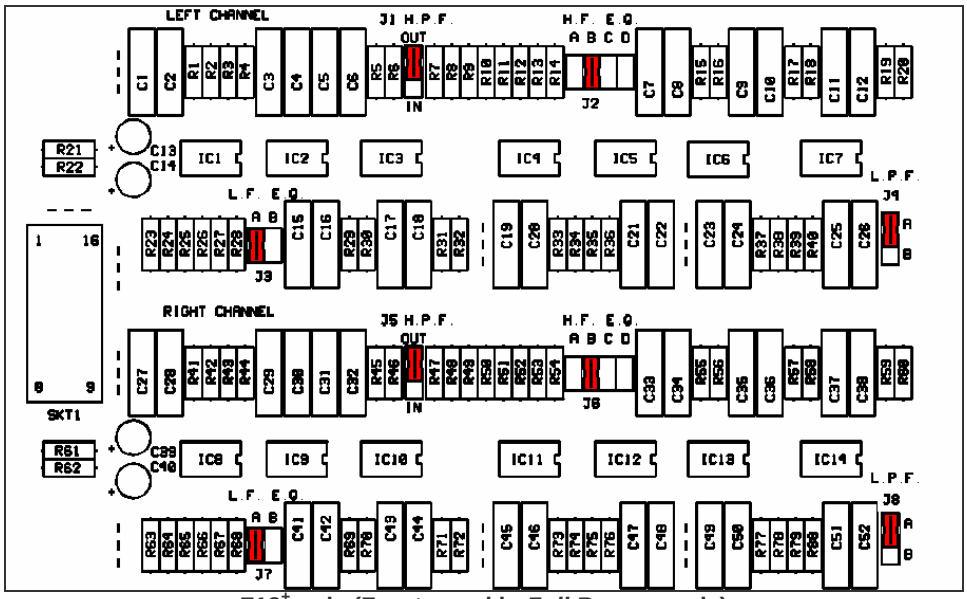
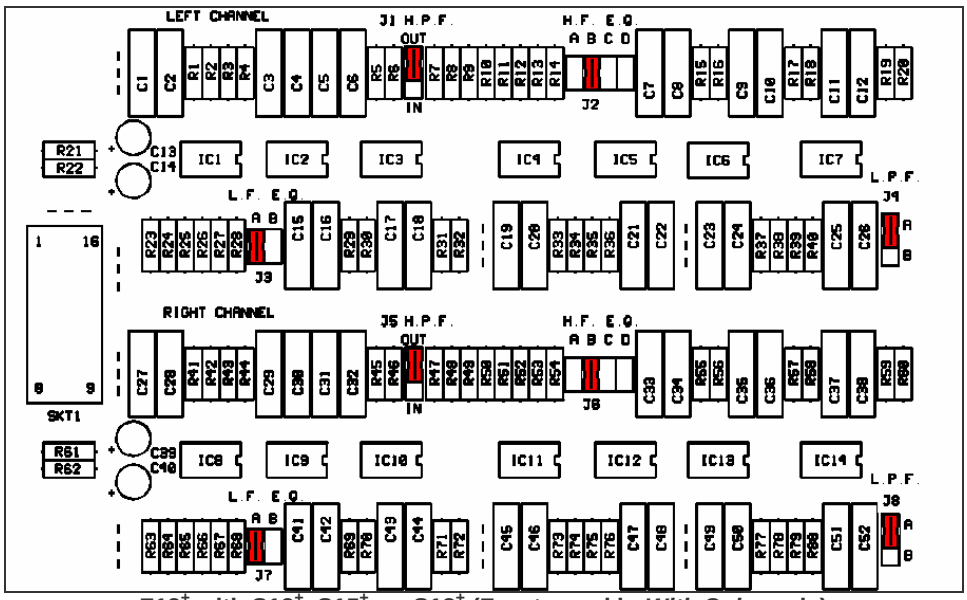


F12^{+} only (Front panel in *Full Range* mode)



F12^{+} with S12^{+}, S15^{+}, or S18^{+} (Front panel in *With Sub* mode)

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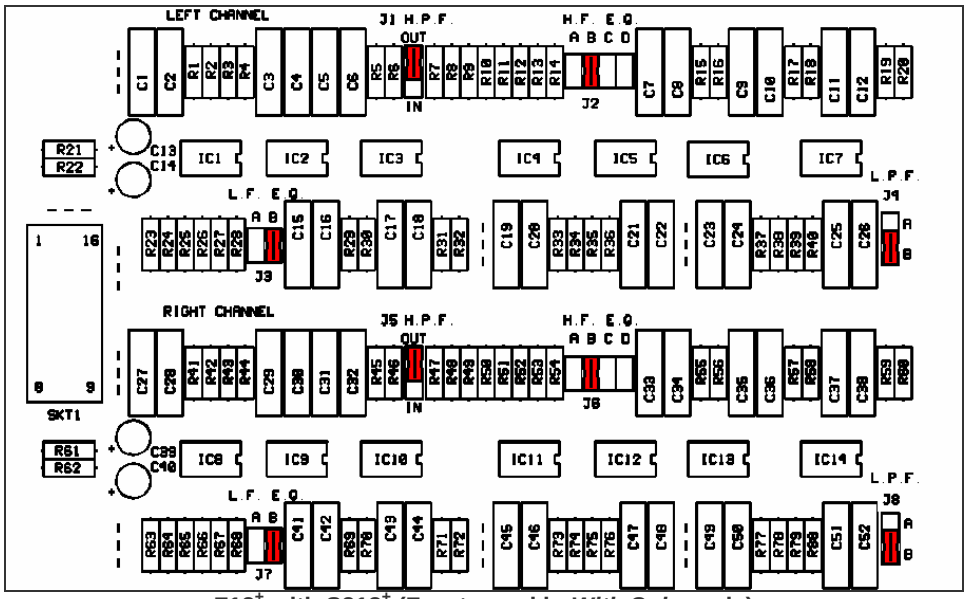
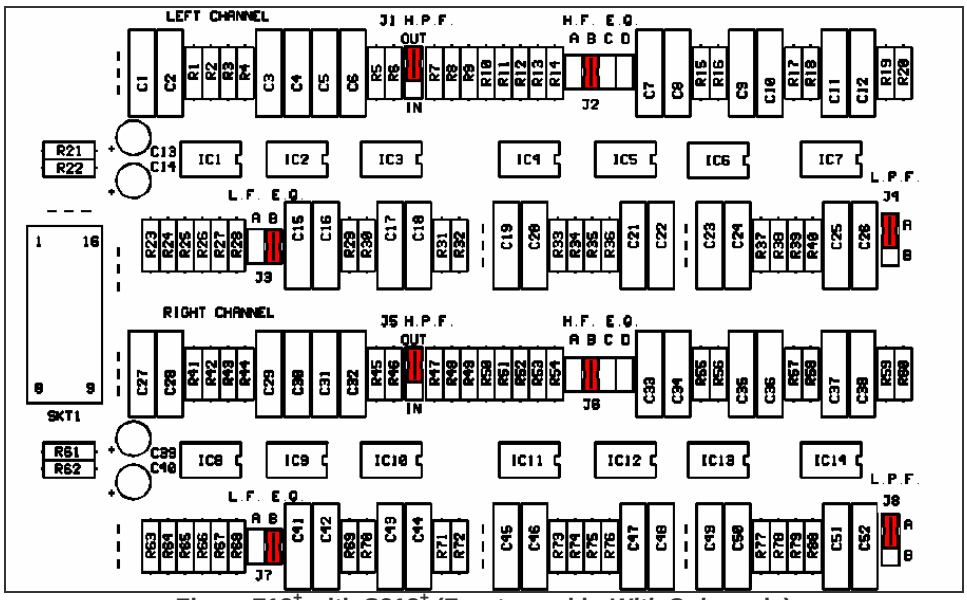


F12+ with S218+ (Front panel in *With Sub* mode)



Flown F12+ with S218+ (Front panel in *With Sub* mode)

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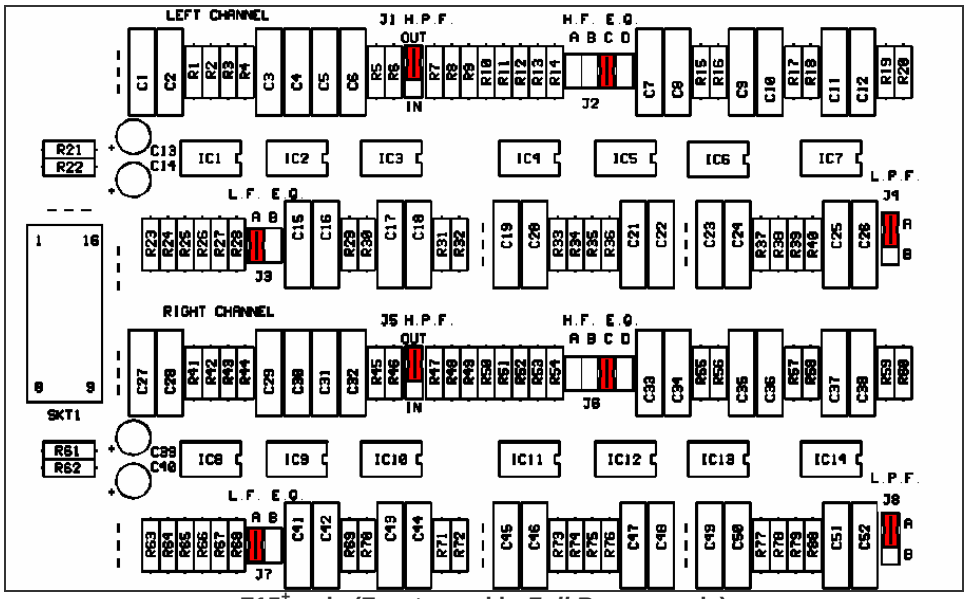
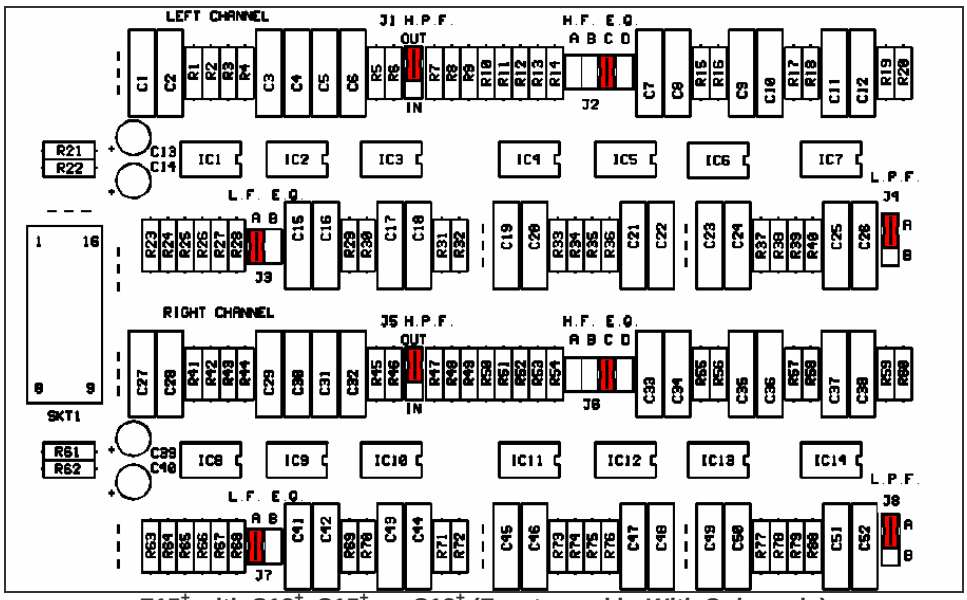


F15^{+} only (Front panel in *Full Range* mode)



F15^{+} with S12^{+}, S15^{+}, or S18^{+} (Front panel in *With Sub* mode)

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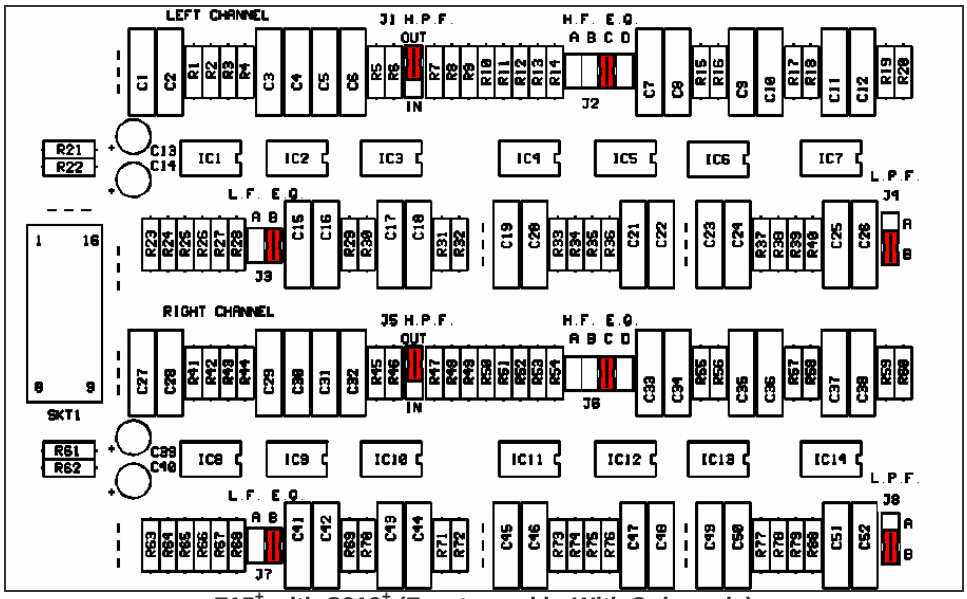
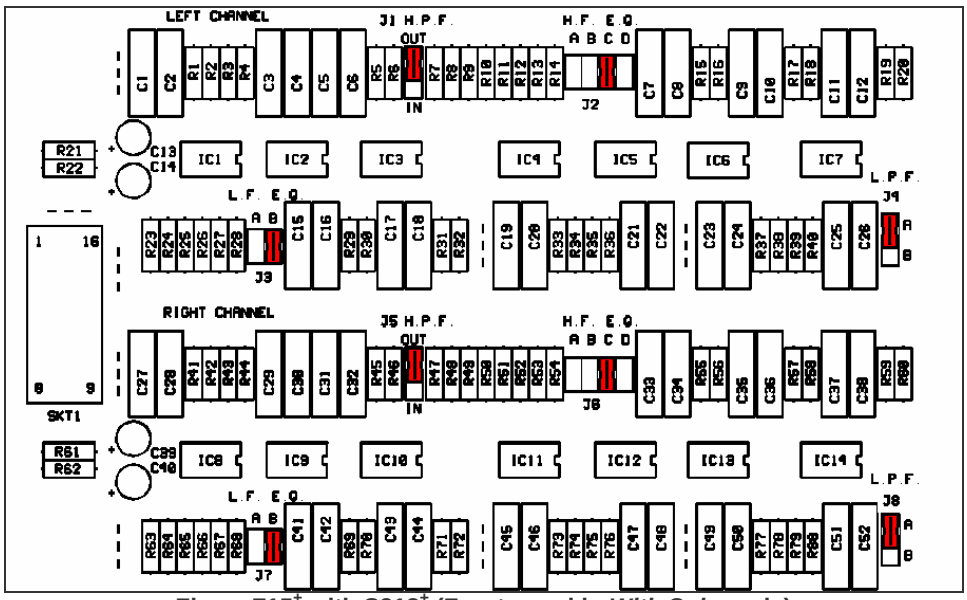


F15^{+} with S218^{+} (Front panel in *With Sub* mode)



Flown F15^{+} with S218^{+} (Front panel in *With Sub* mode)

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Combo Card jumper summary and notes

M3+ Jumpers	J1,J5	J2,J6		J3,J7	J4,J8
F8+	IN*	A	S12+,S15+,S18+	A	A
F10+	IN*	B	S218+ FLAT	B	B
F12+	OUT	B	S218+ OVERLAP**	B	A
F15+	OUT	C			
*WHEN IN "WITH SUB" MODE		** USE "OVERLAP" WHEN S218+ USED			
FIT JUMPER IN "OUT" POSITION		WITH FLOWN F8+, F10+, F12+, F15+			

Combo Card "Full Range" jumper configurations

S218+ Flat
This setting provides a tradition main-to-S218+ crossover when F8+, F10+, F12+ or F15+ loudspeakers are placed on (or pole-mounted just above) the subwoofers.

S218+ Overlap
This setting optimizes the main-to-S218+ crossover when F8+, F10+, F12+ or F15+ loudspeakers are flown in an open space – well away from room surfaces (e.g. from a truss).

Top card high pass filter
The Combo Card high pass filter (HPF) jumpers - J1 & J5 - should be placed in the ***Out*** position when the front panel ***With Sub*** is selected as the LF cutoff for the F8+, F10+, F12+ or F15+ loudspeaker is set by the motherboard main-to-sub crossover function in this mode.

10.5 *M3+ F215+* top card*
For use with Blackline the F215+ full range or with S218+

10.6 *M3+ H3A+* top card*
For use with Blackline the H3/H3H+ bi-amplified

10.7 *M3+ 218+* top card*
For use with a second M3+ controller where a Blackline bi-amplified H3/H3H+ is to be used with an S218+

*** Pending. Please contact info@martin-audio.com for further information.**

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